RESPECTIVE RESPONSIBILITIES OF TRUSTEES AND INDEPENDENT EXAMINERS
As described on page 77 the Trustees are responsible for the preparation of the accounts and they consider that Charities Act 1993 Section 43(2) (audit requirement) does not apply. It is our responsibility to carry out procedures designed to enable us to report our opinion.

BASIS OF OPINION
This report is in respect of an examination carried out under section 43 of the Charities Act 1993 and in accordance with the directions given by the Charity Commissioners under section 43(7)(b). An examination includes a review of the accounting records kept by the charity trustees and a comparison of the accounts presented with those records. It also includes a review of the accounts and making such enquiries as are necessary for the purposes of this report. The procedures undertaken do not constitute an audit.

OPINION
No matter has come to our attention in connection with our examination which gives us reasonable cause not to believe that in any material respect:
(i) accounting records have been kept in accordance with Section 41 of the Charities Act 1993; or
(ii) the accounts accord with those records; or
(iii) the statement of accounts complies with the accounting requirements of the Charities Act 1993.
No matter has come to our attention in connection with our examination to which, in our opinion, attention should be drawn to enable a proper understanding of these accounts.

Sevonoaks
Kent
TN13 1XR
4 May 1999

PORRITT RAINEY & CO.
Registered Auditors
Chartered Accountants

Geographic variation and taxonomy of the Cave Swallow (*Petrochelidon fulva*) complex, with the description of a new subspecies from Puerto Rico

by Orlando H. Garrido, A. Townsend Peterson & Oliver Komar

Received 9 July 1997

The Cave Swallow *Petrochelidon fulva* complex is distributed locally from the southwestern United States and the Caribbean to northwestern South America (AOU 1983). The taxonomy of the group has been unstable throughout its history: although five forms were originally described as distinct species (Peters 1960), several recent reviews of the complex treated all forms as constituting one highly polytypic species (Peters 1960, Sibley & Monroe 1990). Recent treatments have varied in conclusions regarding species limits in the group: Phillips (1986) and AOU (1983) treated all of the North American and Caribbean forms within one polytypic species; Ridgely & Tudor (1989) treated the South American forms as a separate species (followed by AOU 1997); and Smith *et al.* (1988) suggested specific status for the continental forms vs those of the Caribbean (including Yucatan).

Even more unstable than species limits in the group has been the taxonomy at the level of subspecies. The populations of the Caribbean and Yucatan Peninsula differ among localities, yet much of this differentiation has been obscured by the treatment of all Caribbean forms as part of the nominate subspecies (Peters 1960), as if no geographic variation existed. Nevertheless, as numerous authors have pointed out (e.g. Ridgway 1904, Wetmore 1916, Phillips 1986), significant variation does exist among island populations, making the

use of subspecific epithets desirable. Here we address in particular the distinctiveness of the population of Puerto Rico, which Wetmore (1916) considered part of the Jamaican population. Our studies, however, confirm its distinctiveness; hence, the purpose of this paper is to address geographic variation, species limits, and subspecific differentiation in the Cave Swallow complex.

Methods

Specimens (N=144: 51 males, 56 females, 7 unsexed) of Cave Swallows were gathered for study from the collections of the Delaware Museum of Natural History, Florida Museum of Natural History, Louisiana State University Museum of Natural Science, U.S. National Museum of Natural History, University of Kansas Natural History Museum, and the University of Michigan Museum of Zoology; additional specimens were examined and measured at Royal Ontario Museum, Museum of Comparative Zoology, American Museum of Natural History, Carnegie Museum of Natural History, Academy of Natural Sciences (Philadelphia), Museo Nacional de Historia Natural (Havana, Cuba), Museo "Felipe Poey" of the Universidad de la Habana, and Institute of Jamaica. Each individual was measured for bill length from the anterior edge of the nostril and (for some individuals) exposed culmen, tarsus length (to lowest undivided scute), wing length, tail length, and depth of tail fork (difference in length between longest and shortest rectrices).

Geographic variation in patterns of colouration of different populations was evaluated by direct comparison of each sex. All characters mentioned as geographically variable in the scientific literature were considered and evaluated. Additional information from fieldwork ongoing by Garrido and others (unpubl. data) regarding variation in mass and nest structure was also considered. For statistical analysis, specimens were grouped into 10 population samples: (1) Texas, (2) northern Mexico, (3) Chiapas, (4) Yucatan Peninsula, (5) Jamaica, (6) Puerto Rico, (7) Hispaniola, (8) Cuba, (9) Peru, and (10) Ecuador.

Geographic variation

Populations of the Cave Swallow complex breed in several regions scattered through the Americas: central and southern Texas and New Mexico, northern Mexico, interior Chiapas, the Yucatan Peninsula, northwestern South America, and in the Greater Antilles on the islands of Cuba, Isle of Pines, Hispaniola, Jamaica, and Puerto Rico. Although Texas and northern Mexican populations migrate to winter on the Pacific coastal plain of Central America (Komar 1997), Caribbean and South American populations are generally sedentary, apart from Cuban populations, most of which migrate to unknown destinations (A. Llanes, pers. comm.).

Morphometrics

Character variation based on the relatively small samples available showed no striking deviations from a normal distribution; however,

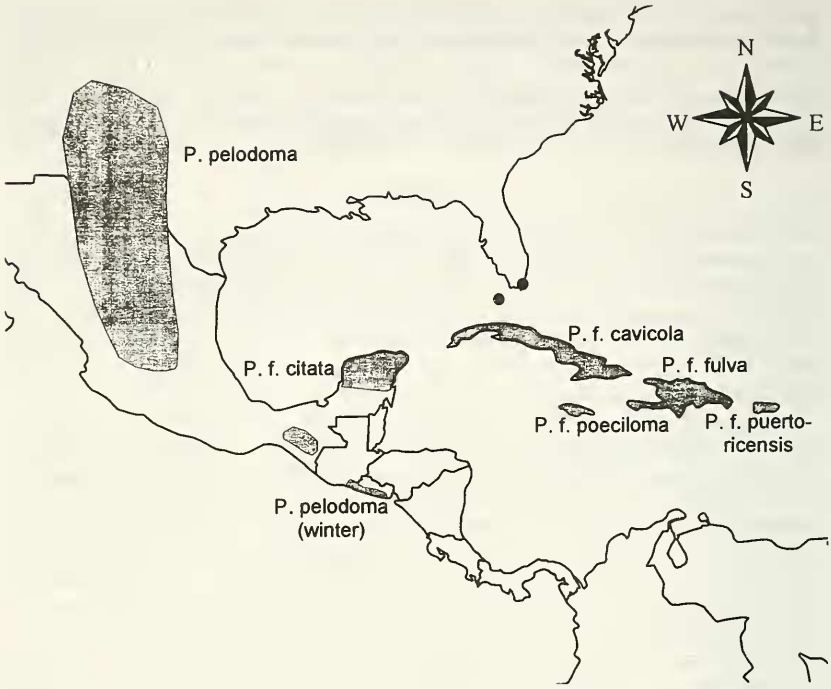

Figure 1. Map showing the distribution of Mesoamerican and Caribbean populations belonging to the Cave Swallow complex. Dots indicate recently colonized areas of Florida, probably representing populations of the Cuban subspecies, *P. f. cavicola*.

because some tests of normality indicated significant deviations, we used nonparametric statistics throughout the limited analyses. Tests (Mann–Whitney U) of sexual dimorphism in the largest samples available showed near-significant differences in the populations of the Yucatan Peninsula (10 males vs 7 females, $0.05>P>0.10$), although not in those of Cuba (8 males vs 5 females, $P \gg 0.05$). Workers with ample experience with Cuban populations are able to separate sexes reliably (A. Llanes and A. Kirkconnell, pers. comm.), indicating that sexual dimorphism is not negligible; for this reason, we analysed sexes separately throughout.

Geographic variation was striking in essentially all population comparisons (Figure 2). In all three characters tested statistically, interpopulation differences were significantly greater than expected at random ($P<0.05$, Kruskal–Wallis test). Populations from Texas and northern Mexico had long wings and tails, whereas the populations of the Greater Antilles were especially short in both characters (Figure 2). Populations from Texas and northern Mexico were fairly clearly separable on the basis of bivariate plots of wing vs tail lengths.

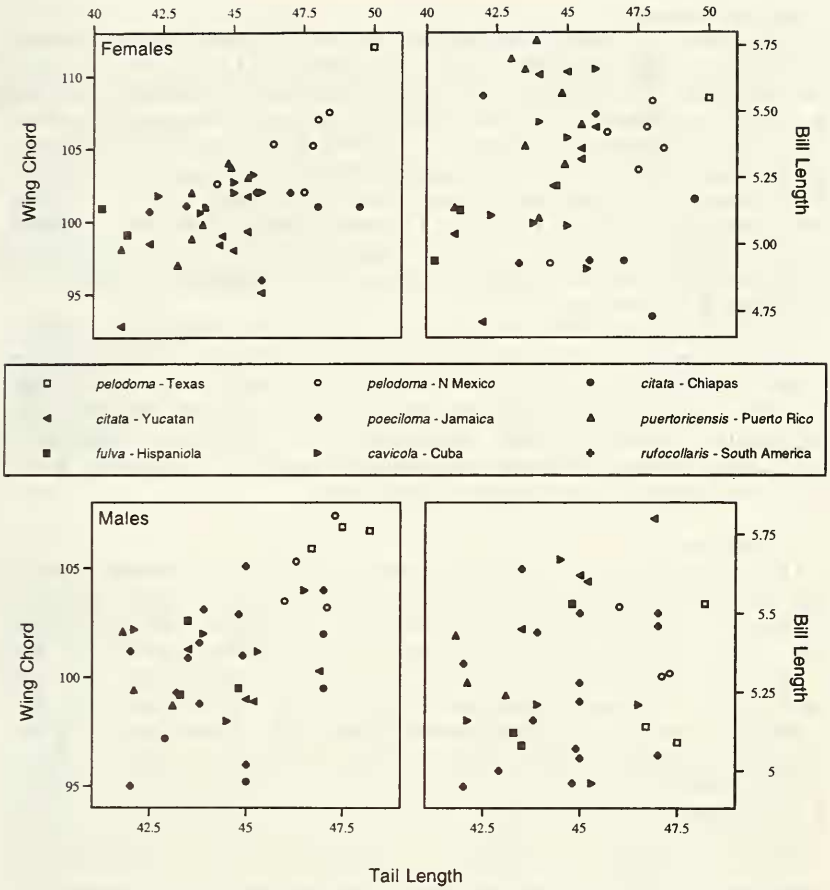

Figure 2. Bivariate plots showing aspects of morphometric variation among populations of the Cave Swallow complex. Actual sample sizes are larger than those shown because numerous points are hidden behind others with identical measurements.

Mass

Mass data available, although limited for some populations and not controlled for confounding factors such as fat levels, suggested differences among populations. The largest individuals in body mass were those of Texas and northern Mexico, whereas Caribbean and southern Mexican populations averaged smaller. Among the latter forms, Cuban individuals were generally larger, and those of Jamaica and Puerto Rico averaged much smaller. Hispaniolan birds were not possible to assess because only one individual had been weighed. The South American populations averaged relatively small in body mass, comparable to the smaller Caribbean populations.

Plumage characters

Geographic variation in plumage characters showed clear differences among populations (Table 1). Populations of Texas and northern Mexico were overall light in ventral colouration, in contrast with the Antillean populations, which tended to be more strongly coloured cinnamon or chestnut. Martin *et al.* (1986) documented that juveniles of the Texas populations have significantly higher frequencies of white feathering in the face and throat than individuals of the Yucatan populations. Selander & Baker (1957) noted a higher frequency of black feathers on the throats of Texas individuals, a characteristic they hypothesized resulted from occasional hybridization with Cliff Swallows *P. pyrrhonota*.

The populations of the Antilles also vary in the extent and intensity of the cinnamon or chestnut colouration on the forehead, nape, rump, breast, and flanks, with those of Puerto Rico being the overall most intensely coloured, and those of Cuba and Hispaniola are the least. The populations of northwestern South America contrast strikingly in having the chestnut forehead patch reduced, and a white or beige throat that contrasts with the chestnut breast band.

Nest structure

Differences in nest structure have played an important role in taxonomic decisions in the Cave Swallow complex (e.g. Smith & Robertson 1988). Nest type variation in the group can be distilled into four distinct nest structures: (1) a balcony structure, like a crescent-shaped half-saucer; (2) a half-cup attached to a vertical surface; (3) an enclosed structure with entrance near the apex; and (4) a globular structure with a side entrance (unusual). Texas Cave Swallows typically construct nests that are open cups (type 2; Selander & Baker 1957, Martin *et al.* 1977, Martin 1981). Yucatan and Chiapas populations are also apparently of type 2 (Álvarez del Toro 1980, Allan Phillips pers. comm.). Cuban populations generally construct nests of the balcony type (type 1), seated on horizontal surfaces or in cracks and crevices in cave walls (Gundlach 1876, Garrido pers. obs.). Hispaniolan nests invariably adhere to walls, in the form of a half-cup (type 2; Stockton de Dodd 1978), although some were enclosed with a side entrance (type 4; Wetmore & Swales 1931). Jamaican nests apparently are generally of type 2, adhering to vertical or slanted surfaces (Gosse 1847, Garrido pers. obs.). Puerto Rican populations apparently are generally of the balcony type (type 1), with a few of types 3 or 4 in man-made situations (Wetmore 1916). South American populations construct nests that are globular, with side entrances, often elongated into a bottleneck entrance (T. A. Parker III in Ridgely & Tudor 1989).

Although the open-type nest structure is often cited as a species character for the Cave Swallow complex, a great variety of nest structures is actually found in the group. Populations often show two or more nest types, including enclosed nests, usually considered diagnostic of Cliff Swallow nests. Given that some Cliff Swallow populations nesting in more sheltered sites often do not complete the globular nest (pers. obs.), we suggest that nest structure in this group

TABLE 1
Summary of plumage characteristics of populations of the Cave Swallow complex

Character	Cuba	Hispaniola	Jamaica	Puerto Rico	Yucatan	Texas	S. America
White on belly	Extensive	Extensive	Reduced	Restricted	Extensive	Extensive	Reduced to below breastband
Reddish on breast	Dull, reduced	Dull, reduced	Reddish, more extensive	Dark, extensive	Lighter, reduced	Very light, reduced	Dark breastband
Dorsum	Lustrous blue	Darker	Lustrous blue	Tinged grey	Lustrous blue	No lustre—dull brown or blackish	Lustrous blue or violet
White on dorsum	Wide	Thinner	Less profuse	Sparse	Profuse on upper back	Sparse	Streaks thin and sparse
Rump	Chestnut	Chestnut	Chestnut	Deep chestnut	Light chestnut	Light cinnamon or tan	Cinnamon
Iridescence on crown	Deep blue	Blue	Blue, lightly tinged green	Blue tinged green	Blue tinged green	Blue	Blue tinged violet
Forehead	Chestnut	Chestnut	Light chestnut	Chestnut	Cinnamon	Chestnut	Dark chestnut reduced
Secondary edging	Conspicuous whitish	Less marked whitish	Conspicuous whitish	Conspicuous beige	Conspicuous whitish grey	Conspicuous whitish, greyish, and beige	Beige
Undertail coverts	Washed rusty, no colour in juveniles	Like Cuban juveniles	Light rusty	Heavy wash of rusty	Light tan	Pale tan	Light beige

may often reflect nest microhabitat rather than a distinctive nest type for each species. Nevertheless, the above summary indicates that North American and Caribbean members of the Cave Swallow complex generally construct the open-cup type nest, in contrast to the globular structure most commonly constructed by Cliff Swallows.

Species limits and subspecific taxonomy

We take as a working definition of species that of the biological species concept, which sets as a criterion the actual or possible exchange of genes among natural populations. Considering the differences in plumage colouration (Table 1), morphometric characters (Figure 2), and migratory behaviour, we believe it unlikely that the populations of Texas and northern Mexico would interbreed with those of the Greater Antilles if the opportunity were to exist. Comparing the level of differentiation among these two forms with species-level breaks in other swallow taxa (e.g. *Stelgidopteryx serripennis* and *S. ruficollis*), species status is warranted. Even more striking are the differences between the northern populations and those of South America, which are so strong as to surprise us that they were ever considered conspecific (e.g. Peters 1960). Hence, we suggest the following changes to the taxonomy of the *Petrochelidon fulva* complex:

(1) Three allopatric groups of populations are best considered distinct biological species: *P. pelodoma* (see Brooke 1974 for use of *pelodoma* rather than *pallida*) of Texas and New Mexico south through northeastern Mexico; *P. fulva* of the Greater Antilles, the Yucatan Peninsula, and Chiapas; and *P. rufocollaris* of northwestern South America (Ridgely & Tudor 1989, AOU 1997). We propose the following English names for these three species: Cave Swallow, Fulvous Swallow (after Vieillot's original French name "Hirondelle fauve"), and Chestnut-collared Swallow, respectively.

(2) The populations of the Greater Antilles, often considered as not differing geographically, show geographic variation among island populations, breaking down into four geographic subsets recognizable as subspecies, including *P. f. fulva* of Hispaniola, *P. f. cavicola* of Cuba and the Isle of Pines, *P. f. poeciloma* of Jamaica, and an undescribed population on Puerto Rico. Differences between the two described races of the South American populations were supported by the limited series available to us, so we suggest that these two subspecies *P. r. rufocollaris* and *P. f. aequatorialis* be maintained as valid.

All three of the biological species recognized herein qualify as valid, diagnosable, and presumably monophyletic taxa that could be recognized as phylogenetic species (Zink and McKitrick 1995); several of the populations included (e.g. that of Puerto Rico) may also merit recognition as phylogenetic species as well.

A summary of the taxonomy, distribution, and distinguishing characters for each population in the Cave Swallow complex follows,

including the description of one population previously not recognized as distinct.

Petrochelidon pelodoma (Brooke 1974)

Distribution. Central Texas and southern New Mexico south into northern Mexico, south to Coahuila, San Luis Potosí, and Tamaulipas. Apparently extended its distribution northward from Mexico into Texas in the past century (Selander & Baker 1957), with expansion continuing to the present (West 1995). Not recorded on migration in Chiapas (*contra* Peters 1960, refer to *P. f. citata*), but winters along the Pacific coastal plain of El Salvador (Komar 1997).

Diagnosis. Larger generally, with wings and tail especially long in relation to body size. Body mass 5.4–6.4 g greater than birds of Yucatan populations (West 1995). Throat and crissum lighter, approaching beige or light cinnamon, instead of dark cinnamon or chestnut. Rump, collar, and forehead all relatively lighter cinnamon.

Synonyms. *Petrochelidon fulva pallida* Nelson 1902 (see Brooke 1974 for use of the name *pelodoma*).

Petrochelidon fulva citata Van Tyne 1938

Distribution. Resident in northern portion of the Yucatan Peninsula and interior valley of Chiapas.

Diagnosis. Compared to *P. pelodoma*, smaller in wing, tail, and bill; brown more extensive and intense on breast and throat; white of belly more restricted; and rump darker (Van Tyne 1938). Compared with other populations of *P. fulva*, lightest in general colouration, especially in the chestnut of forehead and rump. Populations of interior Chiapas may be lighter in cinnamon of breast and throat, but differences are on average only, described by Miller *et al.* (1957) as intermediate toward *P. pelodoma*; early doubts as to the existence of a resident population in this region were unfounded (Amadon & Eckelberry 1955).

Petrochelidon fulva fulva (Vieillot 1807)

Distribution. Hispaniola and Gonave islands only. Resident.

Diagnosis. Closely similar to *P. f. cavicola*, with lustrous blue of back darker, thinner white streaking on back (though more than individuals of *P. f. poeciloma* and from Puerto Rico). Crown darker than individuals of *P. f. poeciloma* and from Puerto Rico, but somewhat lighter than *P. f. cavicola*; forehead darker than individuals of *P. f. poeciloma* and from Puerto Rico, but similar to *P. f. cavicola*. Secondary edgings less conspicuous than other populations of *P. fulva*. Undertail coverts rather devoid of reddish colour, resembling juveniles of *P. f. cavicola*, and contrasting sharply with individuals from Puerto Rico.

Petrochelidon fulva cavicola Barbour & Brooks 1917

Distribution. Cuba and Isle of Pines only. Apparently partly migratory, but winter distribution unknown (Barbour 1923; Garrido unpubl. data).

Diagnosis. Closely similar to *P. f. fulva*, distinguished easily from individuals of *P. f. poeciloma* and populations of Puerto Rico by dark

and more lustrous crown with bluish (not greenish) tinge, by the darker forehead, by the secondary edging more whitish, and by the undertail coverts that are creamy beige washed with rusty, rather than strongly coloured rusty. Differs from *P. f. fulva* in the deeper blue iridescence in crown, and by the wider white streaks in the back.

Synonyms. *Hirundo coronata* Lambeye 1850 (not of Tickell 1833; see Peters 1960 for use of *cavicola*).

Petrochelidon fulva poeciloma (Gosse 1847)

Distribution. Jamaica only. Apparently nonmigratory (Gosse 1847).

Diagnosis. White of belly more restricted, and cinnamon more extensive, than *P. f. fulva* and *P. f. cavicola*, but not as much as individuals from Puerto Rico. Back closely similar to *P. f. cavicola*, but with less white; more lustrous than individuals from Puerto Rico. Crown less lustrous black than *P. f. fulva* and *P. f. cavicola*, but more lustrous than individuals from Puerto Rico, and with only a slight tinge of greenish. Forehead lighter than *P. f. fulva* and *P. f. cavicola*, and similar to individuals from Puerto Rico. Undertail coverts less rusty than individuals from Puerto Rico, though rustier than in *P. f. fulva* and *P. f. cavicola*.

Synonyms. *Hirundo melanogaster* Denny 1847 (not of Swainson; see Ridgway 1904).

Petrochelidon fulva puertoricensis subsp. nov.

Holotype. (LSUMZ 143050). Female; 5.5 miles NE Utuado, Puerto Rico; collected 30 August 1962 by D. C. Leber.

Paratypes (all from Puerto Rico) 5.5 miles NE Utuado; six collected 30 August 1962 (LSUMZ 143049–143054). 1.7 miles SW Ensenada; two collected 24 August 1962 (LSUMZ 143047 and 143048). 3 km E Consumo; one collected 5 March 1942 (LSUMZ 23193). Lares; three collected 20 June 1912 (USNM 238965, 238967, 238968). Mayaguez; one collected 6 October 1900 (UMMZ 94912). Aguadilla; two collected 10 June 1912 (USNM 238973, 238977). Quebradilla; one collected 3 July 1912 (USNM 238959). Boquerón; one collected 25 September 1937 (USNM 355169).

Diagnosis. Compared to other *P. fulva* populations, undertail coverts heavily washed with rusty colour, and breast, flanks, and sides more deeply coloured chestnut, with white of belly less extensive. Rump slightly darker chestnut. Back less lustrous blue, with a greyish tinge, and black crown more tinged with greenish.

Description of the holotype. Forehead deep chestnut, reaching almost to interocular, there beginning glossy black with bluish-green iridescence. Brick–cinnamon collar (lighter than forehead) crosses nape just caudal to black cap; cheeks of similar colour, but throat slightly lighter cinnamon. Lores velvety black. Back black with bluish iridescence, streaked with white and light grey. Rump deep chestnut like forehead. Lesser upper wing coverts dull slaty with faint iridescence; greater primary and secondary coverts lighter, without iridescence, faintly tinged with brownish, and edged beige distally. Primaries and rectrices similar to greater coverts. Upper breast greyish

tinged with cinnamon, lower breast darker, approaching chestnut, as are sides and flanks. Belly creamy white. Crissum cinnamon; undertail coverts often marked with blackish, otherwise cinnamon. On dried specimen, bill shiny black, legs and feet dull dark brown. Measurements of the holotype are wing chord 103 mm, tail 43 mm, bill (nostril to tip) 5.3 mm, tarsus 11.3 mm. The type series is uniform with respect to the characters outlined above. Sexes, although similar in coloration in other populations examined, could not be compared for this population owing to lack of male specimens.

Etymology. Named for the island of Puerto Rico, Greater Antilles, which holds all known populations.

Distribution. Endemic to Puerto Rico, Greater Antilles. Resident.

Remarks. This form, formerly not distinguished from other West Indian populations, especially those of Jamaica, is clearly distinct and diagnosable from nearby populations based on the dark brown undertail coverts. Ridgway (1904), who rarely failed to understand biological situations such as this one, had but one worn adult specimen available to him from Puerto Rico, making comparisons difficult.

Petrochelidon rufocollaris rufocollaris (Peale 1848)

Distribution. Pacific coast of northern and central Peru only. Resident.

Diagnosis. Differs strikingly from *P. fulva* and *P. pelodoma* in greatly reduced chestnut of forehead, and in contrasting white throat (sometimes tinged with grey) and brown breast band.

Petrochelidon rufocollaris aequatorialis Chapman 1924

Distribution. Pacific coast of southwestern Ecuador, in provinces of Loja and Guayaquil only. Resident.

Diagnosis. Differs subtly from *P. r. rufocollaris* in having the throat and cheeks more tinged buffy, and by the deeper chestnut of breast and sides (Ridgely & Tudor 1989).

Synonyms. *H. fulva chapmani* Brooke 1974 (see Parkes 1993).

Conclusions

Based on a review of geographic variation in characters of morphometrics, plumage, and nest structure, we document variation among populations of the Cave Swallow complex. The most distinctive populations were consistently those of South America; populations of Texas and the Caribbean also differed in a variety of character sets. Hence, we suggest that these three subsets of the complex are best considered separate biological species. Within the Caribbean populations, we found characters distinguishing four island populations, each of which can be considered subspecifically distinct, requiring us to describe as a subspecies new to science the populations of Puerto Rico.

Acknowledgements

We thank many individuals for assistance in the development of the results reported herein, including the curators and staff of the museums listed in the Methods, as well as

Allan R. Phillips, Storrs L. Olson, William and Sue Smith, Ralph Browning, Alejandro Llanes for comments and suggestions. Carla Dove and Mary LeCroy kindly provided important literature, and Rafael Quiñones, Alejandro Llanes, and Arturo Kirkconnell provided unpublished data. We thank especially J. V. Remsen and Kenneth C. Parkes for their support for our studies. Support for this project included grants to Garrido from the American Museum of Natural History and RARE Center for Tropical Conservation.

References:

Álvarez del Toro, M. 1980. *Las Aves de Chiapas*. Universidad Autónoma de Chiapas, Tuxtla Gutiérrez, Chiapas.

Amadon, D. & Eckelberry, D. R. 1955. Observations on Mexican birds. *Condor* 57: 65–80.

AOU. 1983. *Check-list of North American birds*, 6th edn. American Ornithologists' Union, Washington, DC.

Barbour, T. 1923. The birds of Cuba. *Mems. Nuttall Ornithol. Club* 6: 1–144.

Brooke, R. K. 1974. Nomenclatural notes on and the type-localities of some taxa in the Apodidae and Hirundinidae (Aves). *Durban Mus. Novit.* 10: 127–137.

Gosse, P. H. 1847. *The birds of Jamaica*. John Van Voorst, London.

Gundlach, J. 1876. *Contribución a la Ornitología Cubana*. Imprenta "La Antilla", La Habana.

Komar, O. 1997. Communal roosting behavior of the Cave Swallow in El Salvador. *Wilson Bull.* 109: 332–337.

Martin, R. G. 1981. Reproductive correlates of environmental variation and niche expansion in the Cave Swallow in Texas. *Wilson Bull.* 93: 506–518.

Martin, R. F., Martin, M. W. & Lanier-Martin, N. G. 1986. Geographic variation in white facial markings of juvenile Cave Swallows. *Southwest Nat.* 31: 402–403.

Martin, R. F., Miller, G. O., Lewis, M. R., Martin, S. R. & Davis II, W. R. 1977. Reproduction of the Cave Swallow: a Texas cave population. *Southwest Nat.* 22: 177–186.

Miller, A. H., Friedmann, H., Griscom, L. & Moore, R. T. 1957. Distributional check-list of the birds of Mexico, Part 2. *Pacific Coast Avif.* 32: 1–436.

Parkes, K. C. 1993. The name of the Ecuadorean subspecies of the Chestnut-collared Swallow *Hirundo rufocollaris*. *Bull. Brit. Orn. Cl.* 113: 119–120.

Peters, J. L. 1960. Hirundinidae. Pp. 80–120 *in* E. Mayr & J. C. Greenway Jr. (eds), *Check-list of the birds of the world*, vol. IX. Museum of Comparative Zoology, Cambridge.

Phillips, A. R. 1986. *The known birds of North and Middle America*, Part I. Allan R. Phillips, Denver.

Ridgely, R. & Tudor, G. 1989. *The birds of South America: the oscine passerines*. Univ. Texas Press, Austin.

Ridgway, R. 1904. The birds of North and Middle America, Part III. *U.S. Nat. Mus. Bull.* 50: 1–801.

Selander, R. K. & Baker, J. K. 1957. The Cave Swallow in Texas. *Condor* 59: 345–363.

Sibley, C. G. & Monroe, B. 1990. *Distribution and taxonomy of the birds of the world*. Yale Univ. Press, New Haven.

Smith, P. W., Robertson Jr., W. B. & Stevenson, H. M. 1988. West Indian Cave Swallows nesting in Florida, with comments on the taxonomy of *Hirundo fulva*. *Florida Field Nat.* 16: 86–90.

Stockton de Dodd, A. 1978. *Aves de la República Dominicana*. Museo Nacional de Historia Natural, Santo Domingo.

Van Tyne, J. 1938. The Yucatan form of West Indian Cave Swallow (*Petrochelidon fulva*). *Occ. Papers Mus. Zool., Univ. Michigan* 385: 1–3.

West, S. 1995. Cave Swallow (*Hirundo fulva*). *Birds North Amer.* 141: 1–20.

Wetmore, A. 1916. Birds of Porto Rico. *U.S. Dept. Agric. Bull.* 326: 1–140.

Wetmore, A. & Swales, B. H. 1931. The birds of Haiti and the Dominican Republic. *U.S. Nat. Mus. Bull.* 155: 1–482.

Zink, R. M. & McKitrick, M. C. 1995. The debate over species concepts and its implications for ornithology. *Auk* 112: 701–719.

Addresses: O. H. Garrido, Museo Nacional de Historia Natural, Capitolio Nacional, La Habana, Cuba. A. Townsend Peterson, Natural History Museum, The University of Kansas, Lawrence, Kansas 66045, U.S.A. Oliver Komar, Department of Zoology, Ohio Wesleyan University, Delaware, Ohio 43015, U.S.A.; present address Natural History Museum, The University of Kansas, Lawrence, Kansas 66045, U.S.A.

Bulwer's Petrel *Bulweria bulwerii* on St Helena

by N. P. Ashmole, M. J. Ashmole & W. R. P. Bourne

Received 22 August 1997

On 14 February 1995 MJA found a group of six fresh seabird wings at the top of the steep cliffs at Gill Point, opposite Shore Island, St Helena (15°58′S, 5°43′W). The wings had not been present 16 days earlier. The cliffs here are about 90 m high and consist mainly of loose scoria, with some more massive basalt. They are almost vertical, but a hazardous fishermen's path (which we did not go down) gives access to some rocky ledges just above sea level. The relatively level ground behind the cliff top is a barren volcanic desert locally known as the Bird Ground, where Sooty Terns *Sterna fuscata* have nested—according to a local informant—as recently as about 1984.

One pair of wings belongs to a Madeiran Storm-petrel *Oceanodroma castro,* which is already known to breed on adjacent offshore islets (Rowlands *et al.* 1998) and may also do so at Gill Point. Two other pairs are from Bulwer's Petrels *Bulweria bulwerii,* which in the North Atlantic breed commonly in the Madeira group and Salvages and more rarely in the Azores, Canaries and Cape Verde islands. These birds apparently winter to 39°S in the South Atlantic (Bourne 1995), where they have not yet been found breeding although they commonly nest alongside *O. castro* in the North Atlantic. *B. bulwerii* also breeds widely in the NW Pacific and south to 10°S in the Marquesas; these birds may winter in the Indian Ocean (Marchant & Higgins 1990), where a nest has recently been found by Mike Bell at 20°S on Round Island, off Mauritius (Megyesi & O'Daniel 1997). Bones which may have come from a single individual have also recently been found in a Polynesian archaeological site on Henderson Island at 24°S in the central South Pacific (Wragg 1995).

Three of the Bulwer's Petrel wings from Gill Point had broken humeri but were otherwise intact, while the fourth had been detached at the level of radius and ulna, with the carpus somewhat distorted. The wings are from two individuals, with wing lengths of 201 mm and 189 mm respectively. In both birds the primaries are complete, and although first examination suggested that there were some gaps in the secondary series, we have been unable to find any growing feathers and are not now convinced that any are missing; distortion may have occurred at the base of the feathers when the birds were predated. The